Neutron Activation Data for Neutron Interrogation Applications

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Various schemes have been proposed for active neutron interrogation of containers or luggage, with the intent of locating concealed contraband items such as conventional explosives or restricted special nuclear materials. Relatively intense and energetic neutron sources are usually required in these applications in order to penetrate the containers and to provide unambiguous characteristic signals that are well above background, thereby minimizing both false positives and negatives. Consequently, neutron irradiation of the contents of certain containers during the interrogation process could lead to the production of significant residual activity. This, in turn, might either limit or prevent the application of these methods in those situations where there is a potential for unacceptable public exposure to the induced secondary radiations. This study seeks to identify those particular neutron activation reactions that might be problematic in this context, and it reviews the current status of the pertinent evaluated cross section data available from the major general purpose and special purpose data files for neutron energies up to 20 MeV.

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